

XXXII.—On the Geographical Distribution of the Genus *Anomis*, Hübner (*Lineopalpa auctorum*), a Noctuid of the Family Gonopteridæ. By Colonel C. SWINHOE, M.A., F.L.S., &c.

[Plates IX.—XII.]

THIS paper is in continuation of my paper on the geographical distribution of the subgenus *Cosmophila*, a section of the genus *Anomis*.

In 'Moths of India,' vol. ii. p. 409 (1894), Hampson puts *involuta*, Walker=*basalis*, Walker=*colligata*, Walker, all three from Ceylon, and *propinqua*, Butler, from Aden, as synonyms to *subulifera*, Guenée, from Abyssinia.

He puts *metaxantha*, Walker (type without locality), *combinans*, Walker=*guttanervis*, Walker, both types from Ceylon; *commoda*, Butler, from Japan, *privata*, Walker, from Shanghai, *revocans*, Walker, from Moreton Bay, Australia, *vulpina*, Butler, from Venna Levu, Figi Isl., *inducens*, Walker, from Java, *simulatrix*, Walker, from Sierra Leone, *albitibia*, Walker=*nigritarsis*, Walker, from Ceylon, all under *fulvida*, Guenée, locality erroneously stated to be N. America.

Seitz, in his 'Palearctic Noctuids,' 1914, pp. 359, 360, puts *fulvida* into the genus *Rusicada*, Walker, and puts under it *combinans*, *inducens*, *nigritarsis*, *revocans*, *privata*, and *commoda*, and describes two subspecies—*subfulvida* and *griseolineata*—from China and Japan, unknown to me.

Guenée's habitat for *fulvida* is N. America, but this is evidently an error; it is a common Eastern form; Walker's type of *metaxantha* has no locality—this is also a common Indian form.

Sir George Hampson has pointed out to me that Hübner's genus *Anomis*, type *exacta*, from America, is congeneric with Guenée's genus *Lineopalpa*; *Anomis* was erected in 1827 and Guenée's in 1852, therefore the former has precedence.

I am very much indebted to the Rev. C. R. N. Burrows, the well-known genitalia expert, for the great care and trouble he has taken in the dissection and examination of numerous examples of *Anomis* I have sent him from many localities, and the notes that follow are all entirely due to him.

The differences in the genitalia of some of the forms from widely separated localities is generally very great, but in some cases it is slight, as, for instance, between *sabulifera*

from Abyssinia, *involuta* from Ceylon, and *dona* from Roubourne, W. Australia; but there are distinct differences, and to my mind it is impossible to believe that localities that could not have had any connexion with each other for many hundreds of millions of years could possibly contain one and the same species of Noctuid, which is not migratory, and the larva and pupa of which could not have been carried by any commercial agency.

"The study of the genitalia of Lepidoptera is still in its infancy. It may well be that forms of construction overlap and resemble one another in species far apart in detail and far apart in origin. But this remains to be proved. When one bears in mind cases like those of the genus *Tephrosia* *biundularia* and *crepusculata*, in which the genitalia differ, as far as has been discovered, only in the forms of a few names, or in *Xylophasia*, where the three recognized species—*monoglypha*, *sublustris*, and *lithoxylea*,—in which the difference appears to lie in the number of certain hairs; or, again, when one remembers the number of spines which cannot be separated by the eye, but possess well-marked differences in the genitalia, such as the *nictitans* group of *Hydracia*, and the *Acronicta*'s, *tridens* and *psi*, it may well be that further study is necessary to learn the exact bearing of the genitalia upon classification. Any way, it does not so far appear to have presented greater uncertainty than have other lines of examination." (*Burrows*.)

#### General Facies of *Anomis* and *Cosmophila*.

Valves delicate, sometimes weakly armed, margins generally ragged. Coremata on ninth abdominal segment attached dorsally to the tegumental ring, and also to the valves, extremely extensile and voluminous. Juxta\* usually strongly developed. Scaphium generally present, tip minutely bifid, generally with tuft of long hairs ventral on eighth abdominal segment, connected with strongly developed segmental divisions. Anellus strongly armed with minute spines.

#### SECTION I.

*Juxta* absent. *Anellus* exposed.

*Anomis exacta*, Hübner. (Pl. IX. fig. 1.)

Valves narrow, angulated at mid-length, unarmed.

\* *Juxta* (Pierce), a plate fused to the front of the anellus.

Coremata voluminous, double.  
 Penis long, cornuti two, rounded, small.  
 Saccus bulbed.  
 Caraccas, Venezuela, Jamaica.

*Anomis mesogona*, Walker. (Pl. IX. fig. 2.)

Valves not angled, thickened basally, waved.  
 Coremata double.  
 Anellus spines very minute.  
 Penis with single, broad, flat cornutus.  
 Saccus bulbed.

*Anomis sabulifera*, Guenée. (Pl. IX. fig. 3.)

Valves narrow, angled mid-length, unarmed.  
 Anellus spines small.  
 Coremata voluminous, double.  
 Penis long, thin, cornuti several, spines minute.  
 Saccus pointed.  
 Type, Abyssinia.  
 Dar-es-Salam, E. Africa.

*Anomis involuta*, Walker. (Pl. IX. fig. 4.)

Same as in *sabulifera*, but saccus not pointed, anellus spines very large.  
 Type, Ceylon.  
 Simla and throughout India.

*Anomis dona*, Swinhoe. (Pl. X. fig. 5.)

Similar, but uniformly smaller; anellus spines smaller, saccus pointed.  
 Type, Roebourne, W. Australia.

*Anomis brima*, nov. (Pl. X. fig. 6.)

Similar, a larger and very dark form.  
 Anellus spines smaller than the above.  
 Type, Queensland.

## SECTION II.

### *Juxta* Y-shaped.

*Anomis fulvida*, Guenée. (Pl. X. fig. 7.)

Juxta soft, obtuse, large.  
 Valves short, narrow, truncate, unarmed.

Coremata small, single.

Saccus arcuate.

Penis narrow, cornuti several, fine.

Type, N. America (ex errore).

Assam, throughout India, Malayana, Moluccas. Examples from Assam, Borneo, and Java dissected; genitalia all similar.

*Anomis busana*, nov. (Pl. X. fig. 8.)

Juxta hard, arms widely separated, large.

Valves very large, rounded, ragged, unarmed.

Coremata large, single.

Penis very large, cornuti four, large, various.

Saccus arcuate.

Type, Busan, South-east Borneo.

*Anomis revocans*, Walker. (Pl. XI. fig. 9.)

Juxta soft, obtuse, small.

Valves narrow compared with length.

Coremata small, single.

Penis long, narrow, cornutus single, hooked.

Saccus arcuate.

Type, Moreton Bay.

Queensland, Brisbane, Victoria, Cape York.

*Anomis scitipennis*, Walker. (Pl. XI. fig. 10.)

Juxta soft, pointed.

Valves short, narrow, rounded, unarmed.

Coremata single.

Penis stout, short; cornutus single, hooked.

Saccus pointed.

Type, Sarawak, Borneo.

Sarawak.

### SECTION III.

*Juxta with separate arms.*

*Anomis amboinensis*, nov. (Pl. XI. fig. 11.)

Juxta arms very long, much longer than genital cavity, rigid, blunt.

Valves large, pointed.

Coremata single, voluminous.

Penis very large, cornutus one, large.

Saccus arcuate.

Type, Amboina.

## SECTION IV.

*Juxta quadrata.*

*Anomis combinans*, Walker. (Pl. XI. fig. 12.)

Juxta rigid, small.

Valves large, wide.

Harpe soft, spined.

Coremata voluminous.

Penis very large, cornuti several, large.

Saccus rounded.

Scaphium beaked.

Types, Ceylon.

Kandy, Kina Balu, N. Borneo, Engano Island.

Genitalia all similar, but the Bornean examples are much darker than those from Ceylon and the Engano form very dark.

*Anomis albitibia*, Walker. (Pl. XII. fig. 13.)

Juxta rigid, small.

Valves large, ovate.

Harpe soft, spined.

Coremata double, voluminous.

Penis very large, cornuti several, large.

Saccus rounded.

Scaphium linear.

Types, Ceylon.

Assam, S. India, Perak.

*Anomis commoda*, Butler. (Pl. XII. fig. 14.)

Juxta rigid, very large.

Valves large, rigid.

Coremata voluminous, double.

Penis very large, cornutus one, curved.

Saccus rounded.

Type, Japan.

Nikko, Yokohama.

*Anomis metaxantha*, Walker. (Pl. XII. fig. 15.)

Juxta rigid, smaller than genital cavity.

Valves very large, pointed.

Harpe hard, long.

Coremata voluminous, double.

Penis very large, cornutus one, large, hooked.

Saccus rounded.

Type-locality ignotus.

Assam, Sikkim, Nilgiris, India generally.

*Anomis sumatrana*, nov.

♀. Upperside: head, body, and fore wing uniform ochreous grey, transverse lines red-brown: fore wing with a short subbasal line from the costa, an antemedial slightly sinuous line from the hinder margin to the median vein; a medial perfectly straight line not quite reaching the costa, a straight line between this and the outer margin, running from the median vein to near the costa; costal line red-brown; cilia dark brown: hind wing suffused with brown. Underside uniformly pale ochreous grey; both wings crossed a little beyond the middle by a pale greyish line, outwardly curved on the fore wing below the costa and bent outwards at the middle on the hind wing.

Expanse of wings, ♀,  $1\frac{6}{10}$  inch.

Padang, Sumatra; two examples.

*Anomis involuta*, Walker, xiii. p. 1003 (1857).

Siam, Yattung, Ceylon, Assam, Karachi, Simla, Bombay, Nilgheris.

*Anomis dona*, Swinhoe.

Uniformly smaller than the preceding, the underside without the pale blackish suffusion through the cell of the fore wing.

Roebourne; seven examples.

*Anomis brima*, nov.

Upperside: fore wing dark olive-brown, transverse markings blackish, the entire wing irrorated with black atoms; subbasal line indistinct, antemedial line outwardly oblique from the costa; a broad discal blackish band, its outer edge with several angles; a round paler space in the upper part of the band: hind wing uniformly dark blackish; cilia of both wings white. Underside with black suffusion on the entire surface of both wings except on the borders.

Expanse of wings, ♂ ♀,  $1\frac{4}{10}$  inch.

Type, ♂, Queensland; type, ♀, Roebourne; three examples.

*Anomis fulvida*, Guenée.

Its square form of wings and the clear white spots forming the orbicular and reniform easily distinguish it. It is well figured in Hampson's 'Moths of India,' vol. ii. p. 409.

I have it from Assam, Kina Balu, Sarawak, Java, and Perak, many examples. I have had the genitalia of examples from several localities examined by Mr. Burrows; he says they are all identical.

*Anomis busana*, nov.

♂. Fore wing narrower than in *fulvida*; colour uniform bright ferruginous, the orbicular white but very small, the reniform obsolescent, represented by a pale, brownish, indistinct dot, with another below it, but well separated from it; the transverse lines darker red and highly sinuous, the sub-basal and antemedial lines outwardly oblique from the costa, the postmedial line erect but not reaching the costa, the sub-marginal line finishing some distance from the hinder angle; a line between the last two from the costa to the median vein; cilia brown, with white tips: hind wing slightly suffused with brown, paling towards the abdominal margin; cilia white, with grey spots.

Expansion of wings, ♂,  $1\frac{7}{10}$  inch.

Type, Busan, S.E. Borneo; two examples.

*Anomis revocans*, Walker.

A large form, much larger than any of the Indian species. Fore wing dark ochreous brown-red as a rule, some specimens a little paler: hind wing suffused with black transverse lines much as in *busana*; orbicular and reniform small and pale black, in one example the reniform is large, deep black, with a curled black line connecting it with the black spot above it. In size, colour, and in the formation of the genitalia it is quite distinct.

I have it from Victoria, Brisbane, Queensland, and Cape York.

*Anomis scitipennis*, Walker, Journ. Linn. Soc., Zool. vii. p. 76 (1864).

*Cosmophila ochreifusa*, Swinhoe, Ann. & Mag. Nat. Hist. (8) xviii. p. 408 (1906).

A very distinct species.

Walker's type came from Borneo, mine from Sumatra. I

have only one example from Borneo, and have had its genitalia examined (Pl. XI. fig. 10). It very nearly resembles my type of *ochreifusa* in the Brit. Mus., and therefore I put it provisionally here until I can get a specimen for dissection.

*Anomis amboinensis*, nov.

♂. Fore wing narrow; head, body, and fore wing clear ochreous red-brown, very uniform in colour; the orbicular represented by a very minute white dot; the transverse lines hardly visible, the postmedial and two lines (all very sinuous and upright) somewhat close together before the outer margin, only faintly indicated: hind wings pale ochreous grey without markings; cilia of both wings white, with ochreous-red points. Underside: fore wing pale ochreous red, the hinder marginal space and the entire hind wing nearly white.

Expanse of wings, ♂,  $1\frac{7}{10}$  inch.  
Type, Amboina.

*Anomis combinans*, Walker, xiii. p. 1001 (1857).

*Cosmophila guttanervis*, Walker, xiii. p. 1003.

Smaller, paler, and brighter-coloured than *revocans*; wings similarly shaped.

Types, Ceylon; four examples.

*Anomis inducens*, Walker, xiii. p. 1004.

Paler than *combinans*; the hind wings very pale ochreous grey, in *combinans* they are suffused with blackish; the markings of the fore wing are very similar, but the subbasal line is more oblique and the reniform is always represented by a blackish spot.

Type, Java.

I have three Javan examples and two from St. Aignan Island, Tobriand group.

*Anomis prima*, nov.

A very dark form, larger than *combinans* or *inducens*; the hind wings are entirely dark blackish brown.

Expanse of wings, ♂,  $1\frac{9}{10}$ -2 inches.

Type, Kina Balu, N. Borneo; five examples.



*Anomis albitibia*, Walker, xiii. p. 1001.

*Rusicada nigratarsis*, Walker, xiii. p. 1006.

A small species, very dark, transverse lines quite different to all the others.

Types, Ceylon.

I have examples also from Assam, Ahmednagur, Rangoon, and Perak.

*Anomis commoda*, Butler, Ann. & Mag. Nat. Hist. (5) i. p. 203 (1878).

A large dark species, with fairly broad fore wings; hind wings dark blackish brown. Quite a good species.

Type, Japan.

I have seven examples from Yokohama and Nikko.

*Anomis metaxantha*, Walker, xiii. p. 1005.

Paler than *commoda*; fore wing similarly shaped; the genitalia shows that it is quite distinct from all the others.

Type-locality ignotus.

It is a common form in India. I have sixteen examples from Assam, Rangoon, and Bombay.

XXXIII.—*The Cirripede Subgenus Scillælepas; its Probable Occurrence in the Jurassic Rocks* (S. gaveyi, *sp. n.*). By THOMAS H. WITHERS, F.G.S.

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[Plate XIII.]

MORE than half a century ago the late Mr. G. E. Gavey collected from the Lias at Mickleton Tunnel, near Chipping Campden, Gloucestershire, remains of a Cirripede, which has up till now remained undescribed. Mr. Gavey, however, listed the specimens in 1853\* as "*Pollicipes*; 2 new species," and the late Rev. P. B. Brodie (1857 †), in two short notes,

\* G. E. Gavey, "On the Railway Cuttings at the Mickleton Tunnel, and at Aston Magna, Gloucestershire," Quart. Journ. Geol. Soc. London, 1853, vol. ix. p. 34.

† Brodie, Rev. P. B., "On a new Species of *Pollicipes* in the Inferior Oolite near Stroud, in Gloucestershire," Brit. Assoc. Rep. (1856) pt. ii. p. 64; 1857.

Brodie, Rev. P. B., "On the Occurrence of some new Species of *Pollicipes* in the Inferior Oolite and Lias of Gloucestershire," Ann. & Mag. Nat. Hist. ser. 2, vol. xix. 1857, p. 103.